REMARKS

The Examiner's Office action mailed July 2, 2004, has been reviewed. In response thereto, the Applicants submit this Amendment and Response.

Claim Rejections 35 U.S.C. § 103

The Examiner rejected claims 4-11 as unpatentable under 35 U.S.C. § 103(a) over Hesse et al. Pat. No. 5,833,015 in view of Alft Pat. No. 6,308,787 B1. Applicants respectfully request reconsideration of this rejection.

Independent claim 4, as amended, is directed to a method for backreaming a horizontal borehole. The method comprises automatically rotating and pulling a drill string having a backreamer through the horizontal borehole, automatically reducing a length of the drill string, automatically reducing a rate of pullback if a rotation pressure on the drill string is greater than a predetermined limit, and automatically reducing the rate of pullback if a rotation speed of the drill string is less than a predetermined limit. Each step of the method claim requires automatic operation of the step, without human intervention.

The Hesse reference discloses a system for monitoring the pulling force on a product being installed in a borehole and adjusting the rotational and pulling forces on the product in response to the pulling force measurements. The Hesse reference suggests that in response to the tension forces measured the operator can control the forward advance, the rotational speed, the fluid quantity, or the fluid viscosity. See col. 4, lns.18-22. The reference also mentions the measurements could be provided to an automatic control, but the reference lacks any disclosure of structure for an automatic control device or how to automatically control the drive. See col. 4, lns. 23-25. As the Examiner recognized, the Hesse reference also does not disclose automatically reducing the length of the drill string, as is required by Applicants' present invention.

Alft discloses use of horizontal drilling system having a drilling machine, a drill string, a drive system, a plurality of sensors, and a central processor. Alft broadly suggests that the processor may operate parts of the drilling system. Alft does not, however, adequately describe or teach the operation of the processor to control a pipe handling system to automatically reduce the length of the drill string when the drill string must be shortened. Alft states "a pipe loading controller 141 may be employed to control an automatic rod loader apparatus during rod threading and unthreading operations." See col. 30, lns 30-32. No other description for the "pipe loading controller 141" is provided. Alft also states "the machine controller 74 also controls rotation pump movement when threading a length of pipe onto a drill string 180, such as by use of an automatic rod loader apparatus of the type disclosed in commonly assigned U.S. Pat. No. 5,556,253, which is hereby incorporated herein by reference in its entirety." See col. 30, lns 56- 61. But there is no further discussion of the controller's 74 control of pipe handling and the patent incorporated by reference, U.S. No. 5,556,253, only discloses a mechanical device without any reference to a controller or any automatic controls. In fact, the Alft description falls short of providing a discussion of how to automatically control a step of reducing the length of the drill string, as is required by Applicants' claims.

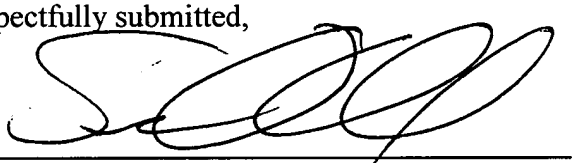
Applicants' claim 4 requires "automatically reducing a length of the drill string when the drill string must be shortened." Applicants' specification comprises a complete description of automatically extending and reducing the length of the drill string; including by incorporating by reference commonly assigned U.S. application Ser. No. 09/146,123 (now U.S. Patent No. 6,179,065) which discloses automatic control of pipe handling systems. The Hesse reference and the Alft reference do not disclose, either alone or in combination, a system that performs the steps of Applicants' claimed method, particularly the automatic reducing of the length of the drill string. Consequently, Applicants submit claim 4 is allowable over Hesse in view of Alft and the 35 U.S.C. § 103(a) rejection must be withdrawn.

Claims 5-11 depend from claim 4 and include all the limitations thereof. Therefore, these claims are also allowable over Hesse and Alft and the rejection of claims 5-11 should also be withdrawn.

Applicants have amended independent claim 4 in order to more properly claim the invention which Applicants are entitled to. Applicants have also added new dependent claim 12. The amendments to the claims contained herein contain no new matter. It is submitted that the claims are allowable and a Notice of Allowance courteously is solicited. Should the Examiner have any questions or comments regarding this amendment or the application, Applicants' attorney would welcome the opportunity to discuss the same with the Examiner.

This is intended to be a complete response to the Office Action mailed July 2, 2004.

Respectfully submitted,



Sean V. O'Connell, Reg. No. 42,951
McKINNEY & STRINGER, P.C.
Corporate Tower
101 North Robinson, Suite 1300
Oklahoma City, Oklahoma 73102-5504
Phone: 405/272-1915
Fax: 405/239-7902

Attorney for Applicant

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